



ROTH ENVIRONMENTAL, LLC

October 8, 2013

Brian Joyner, P.E.
Moffatt & Nichol
800 World Trade Center
Norfolk, VA 23510

RE: Mason Creek
Initial Wetland Characterization/Determination
Project No. 13-163

Dear Mr. Joyner:

Roth Environmental, LLC has completed the Initial Wetland Characterization/Determination on the referenced project site. Mason Creek is a tidal creek in the northern portion of Norfolk, Virginia. It is surrounded by highly developed areas that include residential communities, a naval base, a cemetery, and a park. The total project area, including the creek, is approximately 170 acres.

Mason Creek flows to the northwest to Willoughby Bay. Flow in and out of the creek is controlled by a tide gate situated on the naval air station property. While the tide gate is typically allowed to remain open, it can be closed to prevent tidal surges from entering the system and flooding the surrounding property and homes.

The Mason Creek project area is identified as the portion of the creek that is bordered to the west-northwest by Norfolk Naval Air Station, to the northeast by I-64, to the south by Naval Station Norfolk and Forest Lawn Cemetery, and to the east by Northside Park. The determination involved the classification of approximately 28,000 linear feet of shoreline in the Mason Creek Basin.

Prior to field investigations, research on the site was performed using aerial photographs, U.S.G.S. Topographic Maps, GIS Mapping, and the NRCS Web Soil Survey. The soil survey identifies four main soil types within the project limits. These soils are Altavista-Urban Land complex, Bohicket muck (frequently flooded), State-Urban Land complex, and Udorthents-Dumps complex. All of these soils are listed as hydric by the NRCS with the exception of State-Urban Land complex. This is typical for areas surrounding tidal creeks within the Tidewater Area.

Bohicket muck soil is the primary soil type found in the tidal marsh areas. These soils are very poorly drained. They are found in habitats that are slightly to moderately saline. Within the project area they are typically found within the emergent tidal marsh areas.

The upland shoreline surrounding the project area are mapped as containing Udorthents-Dumps and State-Urban Land complexes. Udorthents-Dumps are predominantly found along the

western edge of the project site on the Norfolk Naval Air Station property. There are also smaller pockets of these soils mapped within the subdivision areas on the eastern portion of the project site. It is likely that these areas were historically filled to raise their elevation. As the Navy base property contains the eastern end of one of their runways adjacent to the creek, it is likely that this area was filled.

State-Urban Land complex soils are predominately mapped on the eastern and northeastern portions of the project site. These areas contain native soils that have high percentages of impervious area within them. The majority of the State-Urban Land soils are mapped in the residential communities along the shoreline.

According to the U.S.G.S. 7.5 Minute Series Topographic Quadrangle Map for Norfolk North, Virginia, the elevations within the project area range from sea level to 10 feet above mean sea level. Moving from the shoreline landward, the elevation of the land surrounding the creek increases relatively quickly. Surface drainage within these areas flows directly into Mason Creek. Additional surface drainage flows into the creek from the urban stormwater management system which discharges directly into the creek at several outfalls.

Roth Environmental, LLC performed the initial wetland/shoreline classification using the Routine Determination Method outlined in the *1987 U.S. Army Corps of Engineers Wetlands Delineation Manual (TR Y-87-1)* and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (TR-08-30)*. These manuals use three parameters (vegetation, soils, and hydrology) in determining and delineating wetlands.

The shoreline surrounding Mason Creek is a mixture of natural vegetated areas along with areas that have been improved. The natural areas consist of unvegetated sandy shoreline, shrub/scrub dominated wetland communities, and emergent tidal wetlands. The shorelines that have been impacted or improved include areas that have been bulkheaded and riprapped. Many of these areas contain wetland vegetation growing within the improved area or behind it.

Shoreline Habitats

Unvegetated Sandy Shoreline

The shoreline along Mason Creek contains several areas that are unvegetated. These areas are comprised of sandy soils and are devoid of vegetation. In many instances, the bank behind the shoreline has eroded and undercut. Soils in these areas are sandy and hydrology is evident by regular tidal flooding and a high tide mark. Typically, the limit of these areas is the steep shoreline bank. Within the Mason Creek study area, the unvegetated sandy shoreline areas are relatively narrow (<20 feet in width).



Figure 1. Unvegetated Shoreline

Emergent Tidal Wetlands

The areas vegetated by emergent wetland species are typically found on very low gradient tidal flats (0-2% slopes), within the vegetated wetland coves, and on the islands found within the creek. These areas are dominated by tidal wetland species such as saltmarsh cordgrass (*Spartina alterniflora*), saltmeadow cordgrass (*Spartina patens*), and saltgrass (*Distichlis spicata*). In many of these areas there is also scattered shrub species such as eastern baccharis (*Baccharis halimifolia*) and Jesuit's bark (*Iva frutescens*). These wetland areas range from being narrow linear wetlands along the shoreline to wide flats that have tidal tributaries/channels flowing through them.

Soils in these areas are low chroma mucky loams (10YR 3/1 – Munsell Soil Color Charts). Hydrology in these wetlands is primarily observed as inundation and saturated soils to the surface. Typically these wetland communities are dictated by elevation and depth of regular tidal flooding.



Figure 2. Emergent tidal wetlands.

Emergent Common Reed Dominated Wetlands

In many of the emergent tidal wetland areas and on the adjacent slopes, common reed (*Phragmites australis*) has colonized to form dense stands of this grass species. Common reed is perennial grass that colonizes tidal and nontidal wetlands primarily by the spread of rhizomes. This invasive species has become so thick in these areas that it has crowded out all native species. By creating these large monotypic habitats, common reed has established itself firmly within the Mason Creek watershed. The spread of common reed is reportedly limited by factors such as water depth and salinity.

Soils within these communities are low chroma mucky loams (10YR 3/1). Hydrology is evident as inundation, saturation to the soil surface, and water stained leaves/vegetation. The common reed areas are found along much of the western shoreline of Mason Creek. They range in size from being narrow linear shoreline habitats (3 feet wide) to wide flat communities within shallow coves.



Figure 3. Emergent wetlands dominated by common reed (*Phragmites australis*).

Shrub/Scrub Wetlands

Along many areas of the shoreline, shrub/scrub species form the dominant community. These habitats are typically five to ten feet wide and parallel the shoreline. In some instances, the shrub/scrub wetlands form landward of emergent tidal wetlands. This is typical in portions of the shoreline that are wider and very low gradient.

The shrub/scrub wetlands are typically vegetated by Jesuit's bark and eastern baccharis. They have low chroma soils (10YR 3/1) and exhibit primary indicators of hydrology such as inundation and saturation to the surface.



Figure 4. Shrub/Scrub wetlands along the shoreline.

Forested Wetlands

One small area of forested wetlands is found along the shoreline on the eastern edge of the project site. This forested wetland is located in the headwaters of a cove and is relatively narrow (10 feet wide). The forested wetlands in this area are vegetated by a canopy of loblolly pine (*Pinus taeda*) and red maple (*Acer rubrum*). Soils within the wetland area are low chroma sandy loams (10YR 4/1). Hydrology is evident by saturated soils within the upper 12 inches.

Riprap Shoreline with Common Reed

Much of the shoreline along the western portion of the creek has been stabilized using riprap. Riprap along the Mason Creek shoreline is comprised of materials such as brick, cinder block, rock, concrete, large stone, and gravel. In many instances, the riprap appears to be construction demolition debris such as concrete or brick material that has been haphazardly placed.

Along many of these shorelines, common reed has colonized the areas between the riprap. This habitat type is typically narrow areas along the toe of slope of the shoreline (5-8 feet wide). Soils vary in these areas due to the addition of construction debris and fill in some instances. Native soils beneath the riprap are low chroma sandy silty loams (10YR 3/1). Hydrology is evident as tidal inundation, saturated soils to the surface, and high tide lines.



Figure 5. Riprapped shoreline with sparse common reed.

Riprap Shoreline

As with the community described above, riprap has been used to stabilize portions of the creek's shorelines. The majority of the riprap along the shoreline of Norfolk Naval Air Station is similar to the materials described above. In the residential areas, the majority of the riprap is limited to broken concrete. Along the side slopes of Granby Street as it crosses Mason Creek, the riprap is composed of quarry stone.

In all of these unvegetated areas, the creek is considered a Waters of the United States. This means that it is a regulated aquatic feature that does not meet the definition of a wetland as it usually only meets one or two of the requirements to be a wetland (hydric soils, hydrology, and hydrophytic vegetation).



Figure 6. Riprapped shoreline.

Bulkheaded Shoreline

Several residential properties have bulkheaded their shoreline along Mason Creek. The bulkheads observed during the site assessment are constructed of wooden sheet piles. In these areas, there are typically no vegetated wetlands channelward of the bulkhead. The homeowners typically have grass lawns that extend landward of the bulkhead.



Figure 7. Wooden bulkhead along Mason Creek.

Bulkhead with Riprap

One property in the eastern portion of Mason Creek has installed a wooden bulkhead with riprap along the foot of the structure. This layering of shoreline protection appears to have been installed to reduce wave energy impacting the bulkhead.

Uplands Surrounding Mason Creek

The upland areas surrounding the Mason Creek shoreline are nearly entirely developed. The majority of the upland areas are associated with residential housing. These uplands are typically converted to grass lawns or forested with landscaped grounds.

The second largest upland land use is by Norfolk Naval Air Station. This military base is found to the west and north of Mason Creek. The base maintains a large portion of the uplands as maintained field surrounding a runway. The remainder of the base is developed as maintained yards surrounding buildings and houses. The military base has allowed narrow upland forested areas to remain between the fields/yards and the Mason Creek shoreline.

The third largest upland land use is cemetery. Forest Lawn Cemetery is located along the southeastern portion of the site. The main portion of the cemetery is maintained lawn. The areas immediately adjacent to the Mason Creek shoreline is forested. These forested uplands range from 20 to 100 feet wide.

Conclusion

The Mason Creek Initial Wetland Characterization/Determination has documented a mixture of natural and improved shoreline conditions. The three most prevalent classifications are riprap (and riprap with common reed), wetland areas dominated by common reed, and saltmarsh cordgrass tidal wetlands. The shoreline conditions are shown on the attached mapping entitled *Shoreline Characterization Map 1 and Map 2* prepared by Moffatt & Nichol dated June 17, 2013.

Please contact me at 814-1048 should you wish to discuss the study in greater detail.

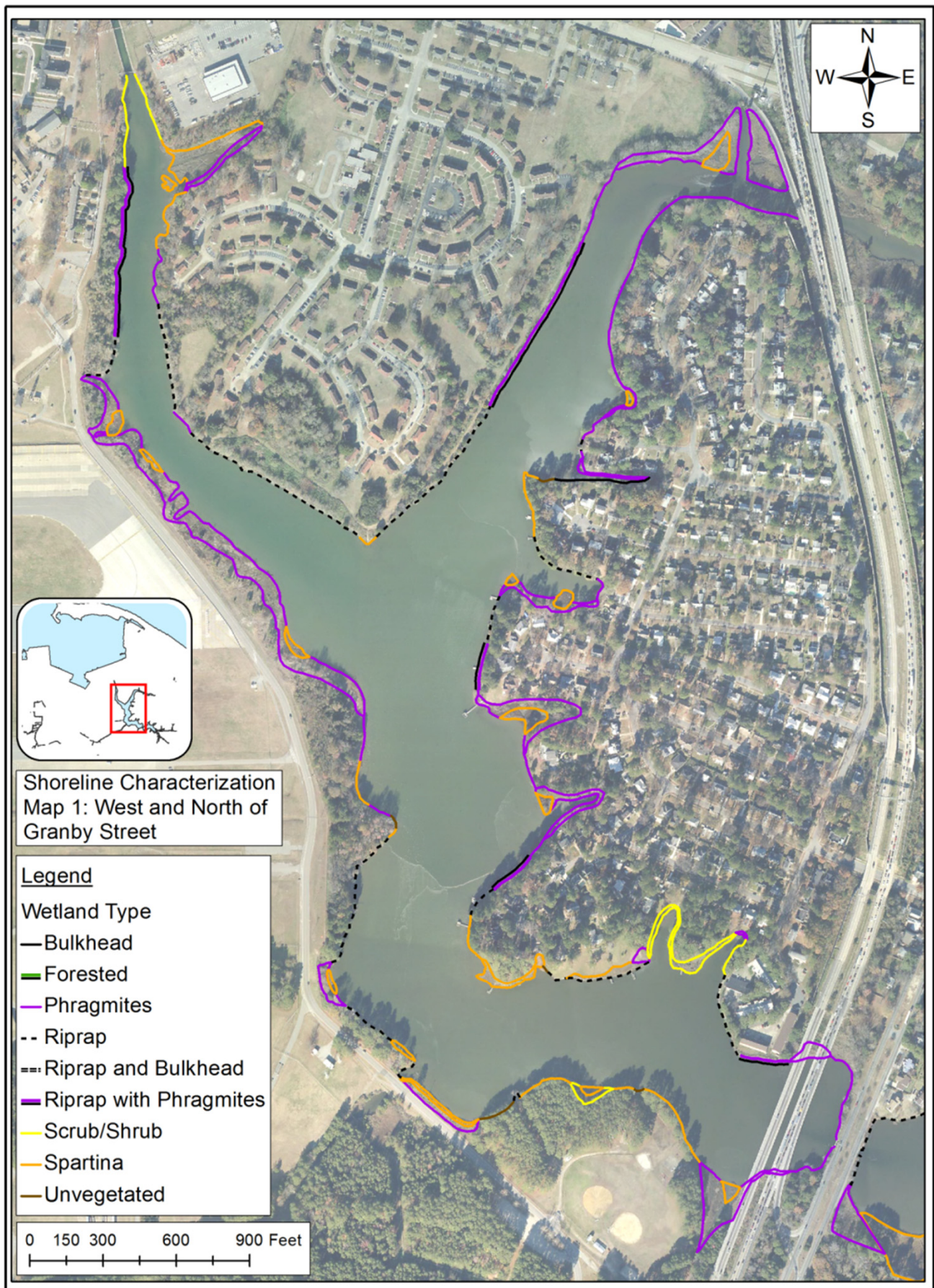
Sincerely,
ROTH ENVIRONMENTAL, LLC



Matthew Roth, P.W.S.
President

Enclosures

Macintosh HD:Users:Roth:Documents:Roth Environmental, LLC:Projects:2013:13-163.Mason Creek:Wetland Habitat
Determination.Mason Creek.revised 2013.10.08.docx





Shoreline Characterization
Map 2: East and West of
Granby Street

Legend

Wetland Type

— Bulkhead

— Forested

— Phragmites

-- Riprap

== Riprap and Bulkhead

— Riprap with Phragmites

— Scrub/Shrub

— Spartina

— Unvegetated

